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MEMORANDUM | February 18, 2014

TO U.S. Fish and Wildlife Service (Service)

FROM Industrial Economics, Incorporated (IEc)

SUBJECT Consideration of Economic Impacts: Screening Analysis of the Likely Economic Impacts of Critical Habitat Designation for the New Mexico Meadow Jumping Mouse

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On June 20, 2013, the Service published a proposed rule to designate critical habitat for the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) under the Endangered Species Act (the Act).[1] As part of the rulemaking process, the Service must consider the economic impacts, including costs and benefits, of the proposed rule in the context of two primary requirements:[2]

- **Executive Order (EO)12866 *Regulatory Planning and Review***, which directs Agencies to assess the costs and benefits of regulatory actions and quantify those costs and benefits if an action may have an effect on the economy of $100 million or more in any one year; and
- **Section 4(b)(2) of the Act**, which requires the Secretary of the Interior to consider economic impacts prior to designating critical habitat.[3]

This memorandum provides information to the Service on the potential for the proposed critical habitat rule to result in costs exceeding $100 million in a single year. If costs do not exceed this threshold, EO 12866 suggests that a qualitative assessment may be sufficient. This memorandum also identifies the geographic areas or specific activities that could experience the greatest impacts, measured in terms of changes in social welfare, to inform the Secretary's decision under section 4(b)(2).[4]

To prepare this assessment, we rely on: (1) the proposed rule and associated geographic information systems (GIS) data layers provided by the Service; (2) the

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[1] Proposed Critical Habitat Rule, 78 FR 37328.

[2] Additional laws and executive orders require the consideration of the distribution of impacts on vulnerable subpopulations, such as small entities and state or local governments. These requirements for distributional analysis are beyond the scope of this memorandum.

[3] Published September 20, 1993. As affirmed by Executive Order 13563, *Improving Regulation and Regulatory Review*, January 18, 2011.

[4] The discipline of welfare economics focuses on maximizing societal well-being. (Just, R.E., D.L. Hueth, and A. Schmitz. 2004. *The Welfare Economics of Public Policy: A Practical Approach to Project and Policy Evaluation*. Edward Elgar Publishing: Northampton, MA.) It measures costs and benefits in terms of the opportunity costs of employing resources for the conservation of the species and individual willingness to pay to conserve those species. Opportunity cost is the value of the benefit that could have been provided by devoting the resources to their best alternative uses. Opportunity costs differ from the measurement of accounting costs (e.g., actual expenses). Welfare economics is recognized by the U.S. Office of Management and Budget (OMB) as the appropriate tool for valuing the costs and benefits of proposed regulatory actions. (U.S. Office of Management and Budget. 2003. *Circular A-4*.)

Service's incremental effects memorandum (described in greater detail later in this memorandum); (3) the results of the Service's outreach efforts to other Federal agencies concerning the likely effects of critical habitat; and (4) limited interviews with relevant stakeholders.

FINDINGS OF THE SCREENING ANALYSIS

Critical habitat designation for the New Mexico meadow jumping mouse is unlikely to generate costs exceeding $100 million in a single year. Data limitations prevent the quantification of benefits.

Section 7 Costs

In occupied areas, the economic impacts of implementing the rule through section 7 of the Act will most likely be limited to additional administrative effort to consider adverse modification. This finding is based on the following factors:

- Any activities with a Federal nexus occurring within occupied habitat will be subject to section 7 consultation requirements regardless of critical habitat designation, due to the presence of the listed species; and
- In most cases, project modifications requested to avoid adverse modification are likely to be the same as those needed to avoid jeopardy in occupied habitat.

In unoccupied areas, incremental section 7 costs will include both the administrative costs of consultation and the costs of developing and implementing conservation measures needed to avoid adverse modification of critical habitat.

This analysis forecasts the total number and administrative cost of future consultations likely to occur for grazing, transportation, recreation, water management, and species and habitat management undertaken by or permitted by Federal agencies within the study area. In addition, the analysis forecasts costs associated with conservation efforts that may be recommended in consultation for those activities occurring in unoccupied areas. The total incremental section 7 costs associated with the proposed designation are estimated to be $20,000,000 in 2014 for both administrative and conservation effort costs; therefore, the total costs of the proposed rule are unlikely to exceed $100 million in a given year.

Other Costs

- The designation of critical habitat is unlikely to trigger additional requirements under state or local regulations. This assumption is based on the protective status currently afforded the species under state regulations.
- The designation of critical habitat may cause grazers to perceive that private lands will be subject to use restrictions, resulting in perceptional effects.

Section 7 and Other Benefits

Various economic benefits may result from the incremental conservation efforts identified in this analysis, including: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from conservation efforts but are not the purpose of the Act (i.e. ancillary benefits). Due to existing data limitations, we are unable to assess the likely magnitude of these benefits.

Geographic Distribution of Impacts

Exhibit 6, presented later in this report, provides estimates of the likely incremental costs in each subunit. The subunit likely to incur the largest incremental costs is Subunit 3C (Rio de las Vacas). This is due to the fact that this subunit overlaps a larger number of allotments compared to other subunits, and therefore fencing costs are relatively high.

SECTION 1. BACKGROUND

The New Mexico meadow jumping mouse (hereafter, mouse) is a small mammal endemic to New Mexico, Arizona, and a small area of southern Colorado.[5] The mouse has highly specialized habitat requirements which are characterized by tall, dense, riparian vegetation.[6] In addition to its specific habitat needs, the species has a short lifespan, low fecundity, low dispersal ability, and short active period, all of which make populations highly vulnerable to extirpations when habitat is lost or fragmented.[7]

The Service proposes to designate approximately 310 stream kilometers (193 stream miles) and 5,843 hectares (14,432 acres) of critical habitat across eight units.[8] The proposed critical habitat is located within Bernalillo, Colfax, Mora, Otero, Rio Arriba, Sandoval, Socorro, and Valencia Counties, New Mexico; Las Animas, Archuleta, and La Plata Counties, Colorado; and Greenlee and Apache Counties, Arizona.[9] Each of the units are considered "partially occupied" because they include areas that have been occupied by the species as well as areas that are not known to be occupied but are considered by the Service to be essential for the restoration of the essential primary constituent elements (PCEs).[10]

Approximately 59 percent of the total proposed designation is located on Federal lands, 29 percent on private lands, nine percent on state lands, and three percent on Tribal lands. Of the proposed critical habitat designation, 183 hectares (452 acres)—lands within Ohkay Owingeh (San Juan Pueblo) and Isleta Pueblo—are explicitly identified by the Service as under consideration for exclusion under section 4(b)(2) of the Act.[11] Exhibit 1 provides an overview of the proposed critical habitat units, including the occupancy status at the time of listing and land ownership by Federal, state, private, and tribal entities. Exhibit 2 provides an overview map of the proposed designation.

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[5] Proposed Critical Habitat Rule, 78 FR 37328; U.S. Fish and Wildlife Service. Species Profile: New Mexico meadow jumping mouse. Accessed November 20, 2013, http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0BX.

[6] Ibid.

[7] Ibid.

[8] Personal communication with the U.S. Fish and Wildlife Service on November 19, 2013.

[9] Proposed Critical Habitat Rule, 78 FR 37328.

[10] Ibid.

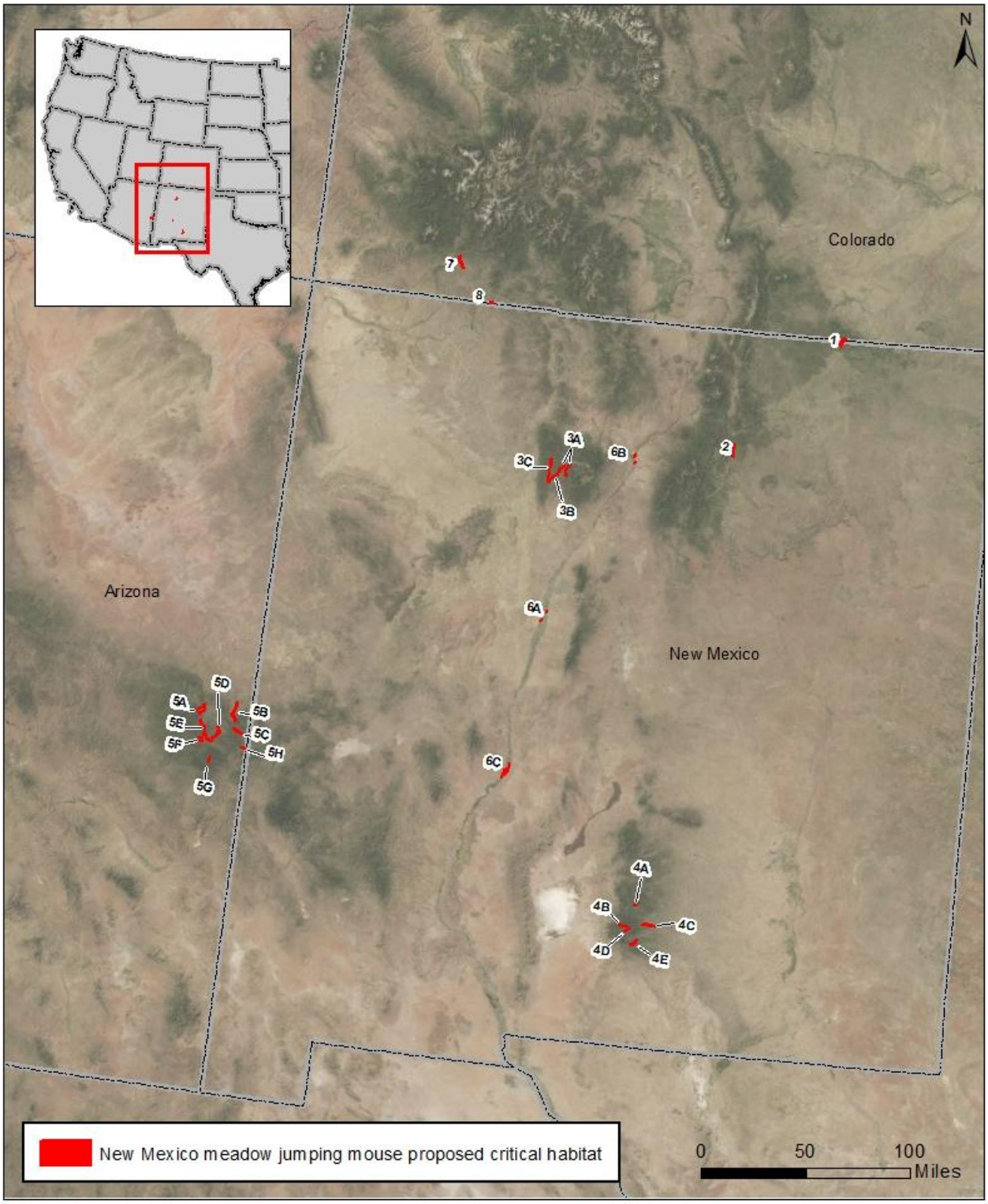
[11] Ibid.

EXHIBIT 1. SUMMARY OF PROPOSED CRITICAL HABITAT UNITS

SUBUNIT	NAME	OCCUPANCY AT TIME OF LISTING	LAND OWNERSHIP (ACRES)				
			FEDERAL	STATE	PRIVATE	TRIBAL	TOTAL
1	Sugarite Canyon	Partial	0	849	0	0	849
2	Coyote Creek	Partial	0	64	527	0	590
3A	San Antonio Creek	Partial	553	0	26	0	579
3B	Rio Cebolla	Partial	686	187	187	0	1,060
3C	Rio de las Vacas	No	820	0	302	0	1,122
4A	Silver Springs	Partial	70	0	190	0	260
4B	Upper Rio Penasco	No	44	0	291	0	335
4C	Middle Rio Penasco	Partial	65	0	587	0	652
4D	Wills Canyon	Partial	162	0	113	0	275
4E	Agua Chiquita Canyon	Partial	398	0	0	0	398
5A	Little Colorado River	Partial	1,100	0	81	0	1,181
5B	Nutrioso River	Partial	351	0	670	0	1,021
5C	San Francisco River	Partial	167	0	455	0	622
5D	East Fork Black River	Partial	1,040	0	0	0	1,040
5E	West Fork Black River	Partial	1,025	120	43	0	1,188
5F	Boggy and Centerfire Creeks	Partial	485	0	0	0	485
5G	Corduroy Creek	Partial	256	0	0	0	256
5H	Campbell Blue Creek	Partial	247	0	6	0	253
6A	Isleta Marsh	No	0	0	0	197	197
6B	Ohkay Owingeh	No	0	0	0	255	255
6C	Bosque del Apache NWR	Partial	995	0	0	0	995
7	Florida River	Partial	6	0	627	0	634
8	Sambrito Creek	Partial	0	150	35	0	184
		Total	**8,470**	**1,370**	**4,140**	**452**	**14,432**

Note: Area sizes may not sum due to rounding.

EXHIBIT 2. OVERVIEW OF PROPOSED CRITICAL HABITAT



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Data Sources:
1. US Fish and Wildlife Service
2. ESRI
Projection: Albers Equal Area Conic (USGS Version)

Because the mouse is not yet listed under the Act, no consultations have been conducted for the species. However, based on information provided in the proposed rule, the Service's incremental effects memorandum, and follow-up communication with the Service, we identified grazing as the main activity occurring within the areas proposed for designation that is likely to experience impacts from the rule.[12,13,14] In addition, we consider possible impacts to water use and management; transportation; recreation; development; and species and habitat management.

SECTION 2. FRAMEWORK

Guidelines issued by the U.S. Office of Management and Budget (OMB) for the economic analysis of regulations direct Federal agencies to measure the costs and benefits of a regulatory action against a baseline (i.e., costs and benefits that are "incremental" to the baseline). OMB defines the baseline as the "best assessment of the way the world would look absent the proposed action."[15] In other words, the baseline includes any existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users absent the designation of critical habitat. The baseline includes the economic impacts of listing the species under the Act, even if the listing occurs concurrently with critical habitat designation. Impacts that are incremental to the baseline (i.e., occurring over and above existing constraints) are those that are solely attributable to the designation of critical habitat. This screening analysis focuses on the likely incremental effects of the critical habitat designation.

We consider incremental effects of the designation in two key categories: 1) those that may be generated by section 7 of the Act; and 2) other types of impacts outside of the context of section 7:

- **Incremental section 7 impacts:** Activities with a Federal nexus that may affect listed species are subject to section 7 consultation to consider whether actions may jeopardize the existence of the species, even absent critical habitat.[16] As part of these consultations, critical habitat triggers an additional analysis evaluating whether an action will diminish the recovery potential or conservation value of the designated area. Specifically, following the designation of critical habitat, Federal agencies must also consider the potential for activities to result in the destruction or adverse modification of critical habitat. These consultations are the regulatory mechanism through which critical habitat rules are implemented. Any time and effort spent on this additional analysis, as well as the costs and benefits of implementing any recommendations resulting from this review, are economic impacts of the critical habitat designation.

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[12] Proposed Critical Habitat Rule, 78 FR 37328.

[13] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

[14] Personal communication with the U.S. Fish and Wildlife Service on October 23, 2013.

[15] OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars_a004_a-4. Circular A-4 provides "guidance to Federal Agencies on the development of regulatory analysis as required under Section 6(a)(3)(c) of Executive Order 12866…" (p. 1)

[16] A Federal nexus exists for activities authorized, funded, or carried out by a Federal agency.

- **Other incremental impacts:** Critical habitat may also trigger additional regulatory changes. For example, the designation may cause other Federal, state, or local permitting or regulatory agencies to expand or change standards or requirements. Regulatory uncertainty generated by critical habitat may also have impacts. For example, landowners or buyers may perceive that the rule will restrict land or water use activities in some way and therefore value the resource less than they would have absent critical habitat. This is a perceptional, or stigma, effect of critical habitat on markets.

SECTION 3. SECTION 7 COSTS OF THE CRITICAL HABITAT RULE

In this section, we discuss the likelihood that the designation of critical habitat will result in incremental costs through the section 7 consultation process. In the baseline, section 7 of the Act requires Federal agencies to consult with the Service to ensure that their actions will not jeopardize the mouse. Once critical habitat is designated, section 7 also requires Federal agencies to ensure that their actions will not adversely modify critical habitat. Thus, a key focus of this screening analysis is whether the designation of critical habitat would trigger project modifications to avoid adverse modification that would be above and beyond any modifications triggered by adverse effects to the species itself.

As described in Section 1, each of the eight proposed critical habitat units are considered "partially occupied" because they include areas that have been occupied by the species as well as areas that are not known to be occupied but are considered by the Service to be essential for the restoration of the essential PCEs.[17] The section 7 costs of the proposed rule are likely to differ depending on whether a project occurs in unoccupied or occupied areas of the proposed designation, as follows:

- **Occupied Habitat**: In occupied areas, activities with a Federal nexus will be subject to section 7 consultation requirements regardless of critical habitat designation, due to the presence of the listed species. The Service is unable to predict situations where a project in these areas would require consultation to address adverse modification without also requiring consultation to address jeopardy concerns.[18] In addition, the Service anticipates that in most cases project modifications recommended to avoid adverse modification will be the same as those needed to avoid jeopardy.[19] Thus, we do not forecast any incremental impacts resulting from project modifications in occupied areas. When section 7 consultations occur, incremental costs are likely to be limited to the additional administrative effort to consider adverse modification during the consultation process.
- **Unoccupied Habitat**: In unoccupied areas, activities with a Federal nexus may not be subject to section 7 consultation requirements absent the designation of critical habitat because the species is not present. Therefore, incremental costs

[17] Proposed Critical Habitat Rule, 78 FR 37328.

[18] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

[19] Ibid.

in these areas would be both the administrative costs and the costs of developing and implementing conservation measures needed to avoid adverse modification of critical habitat.

In the following sections, we provide information on the likely frequency of and costs associated with consultation activity to gauge the likely magnitude of section 7 costs.

SECTION 7 GRAZING COSTS

This section presents our analysis of likely impacts of the proposed designation on livestock grazing activities. As described in the Proposed Rule, the Service considers grazing to be a threat to the species. This analysis focuses on grazing on public lands, as grazing activities on privately-owned ranches typically lack a Federal nexus for section 7 consultation. The United States Forest Service (USFS) manages large amounts of land in proposed critical habitat Units 3, 4, and 5, including land in Santa Fe National Forest, Lincoln National Forest, and Apache-Sitgreaves National Forest. Across the three National Forests, a total of 24 active grazing allotments overlap critical habitat. Exhibit 3 summarizes grazing allotments that intersect with the proposed designation. This analysis assumes that conservation efforts related to grazing may include animal unit month (AUM) reductions on USFS grazing allotments and construction of fencing exclosures to keep livestock out of critical habitat.

EXHIBIT 3. GRAZING ALLOTMENTS INTERSECTING PROPOSED CRITICAL HABITAT

UNIT	FOREST	ALLOTMENT	TOTAL ALLOTMENT AREA (ACRES)	ACRES OVERLAPPING OCCUPIED HABITAT	ACRES OVERLAPPING UNOCCUPIED HABITAT	PERMITTED AUMS	AUM REDUCTIONS ANTICIPATED
3	Santa Fe National Forest	Cebolla San Antonio	26,171	205	899	2,038	No
		Ojito Frio	10,603	-	319	1,109	No
		Red Top	9,927	-	261	397	No
		San Diego	102,739	229	332	3,340	No
		San Miguel	21,916	-	358	517	No
		Vacas	8,034	-	44	1,251	No
4	Lincoln National Forest	Agua Chiquita Trail	28,661	126	272	1,664	No
		Bear Creek	5,706	-	3	240	No
		Bounds	907	23	25	24	Yes
		Curtis Canyon	8,368	-	16	410	No
		Sacramento	111,009	77	254	2,303	No
5	Apache-Sitgreaves National Forest	Boneyard	5,573	-	1	270	No
		Colter Creek	17,182	-	657	306	No
		Grandfather	3,241	17	-	160	No

UNIT	FOREST	ALLOTMENT	TOTAL ALLOTMENT AREA (ACRES)	ACRES OVERLAPPING OCCUPIED HABITAT	ACRES OVERLAPPING UNOCCUPIED HABITAT	PERMITTED AUMS	AUM REDUCTIONS ANTICIPATED
		Nutrioso Summer	15,558	79	23	282	No
		Pool Corral	15,027	-	85	Unknown	No
		PS	3,786	117	346	249	Yes
		Reservation	5,817	24	-	1,358	No
		South Escudilla	16,812	6	35	Unknown	No
		Sprucedale/ Reno	48,082	50	124	328	No
		Turkey Creek	10,853	81	68	180	No
		Voigt	5,720	-	387	740	Yes
		West Fork	19,056	242	415	469	No
		Williams Valley	13,665	82	35	422	No

Note: Acreages were based on geospatial data provided by the relevant National Forests. For Apache-Sitgreaves National Forest, permitted AUMs were calculated from: United States Forest Service, Apache and Sitgreaves National Forest Range Management. 2013 Annual Operating Instructions. Downloaded from http://www.fs.usda.gov/detail/asnf/landmanagement/resourcemanagement/?cid=stelprdb5381976 on December 6, 2013. For Lincoln National Forest and Santa Fe National Forest, permitted AUMs for allotments intersecting proposed critical habitat were provided through personal communication with S. Valdez, Santa Fe National Forest, on December 4, 2013 and with G. Ziehe, Lincoln National Forest, on January 6, 2014.

To estimate costs associated with AUM reductions, we first identify those allotments that could face reductions. We assume that allotments with less than five percent of their total area overlapping the proposed critical habitat will be able to shift grazing activities away from critical habitat areas at minimal cost without affecting the overall level of grazing within the allotment. Following this assumption, 21 of the 24 allotments overlapping the proposed designation are unlikely to experience AUM reductions (see Exhibit 3).

For the remaining three allotments, we assume that AUM reductions due to mouse conservation are proportional to the percentage of allotment area proposed for critical habitat designation.[20,21] AUM reductions in the three relevant allotments range are five,

[20] For Apache-Sitgreaves National Forest, permitted AUMs were calculated from: United States Forest Service, Apache and Sitgreaves National Forest Range Management. 2013 Annual Operating Instructions. Downloaded from http://www.fs.usda.gov/detail/asnf/landmanagement/resourcemanagement/?cid=stelprdb5381976 on December 6, 2013. For Lincoln National Forest and Santa Fe National Forest, permitted AUMs for allotments intersecting proposed critical habitat were provided through personal communication with S. Valdez, Santa Fe National Forest, on December 4, 2013 and with G. Ziehe, Lincoln National Forest, on January 6, 2014.

seven, and 12 percent. Within a given allotment, we allocate AUM reductions to occupied and unoccupied areas based on the proportion of the overlap with critical habitat. AUM reductions attributed to occupied habitat are considered baseline; therefore, we focus our analysis on AUM reductions in unoccupied habitat where impacts are considered incremental. Within unoccupied habitat, our analysis estimates a total reduction of approximately 73 AUMs annually across the three affected USFS allotments. The incremental impacts associated with these reductions are presented below.

In addition to AUM reductions on specific allotments, our analysis anticipates costs associated with fencing exclosures in all allotments intersecting critical habitat. The Service cites fencing of riparian areas as a conservation measure that may be proposed during section 7 consultation.[22] Our analysis assumes that the perimeter of the occupied and unoccupied areas of proposed critical habitat intersecting with USFS grazing allotments will require pipe fencing. Our analysis assumes a high-end linear cost of pipe fencing of $20 per foot, based on information provided by the USFS.[23] Fencing costs for occupied portions of critical habitat are attributed to the baseline, while fencing costs for unoccupied portions are considered to be incremental.

In addition to the costs of AUM reductions and fencing, our analysis anticipates that each of the three National Forests containing proposed critical habitat (Santa Fe, Lincoln, and Apache-Sitgreaves) will undergo a programmatic consultation with the Service in 2014 to consider grazing activities. Our analysis includes the additional administrative costs of considering critical habitat as part of these programmatic consultations. These costs are divided equally among sub-units where grazing occurs within each National Forest. The costs are estimated based on information collected previously from consultation records and discussions with multiple Service field offices. Exhibit 4 presents the average costs of consultation used in this analysis.

[21] AUM reductions represent a high-cost conservation alternative; lower cost alternatives may be available, including shifting cattle rotation patterns and developing alternative water sources. In line with this threshold analysis approach, we focus our analysis on the highest possible cost impact.

[22] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

[23] U.S. Forest Service, Southwestern Region. November 7, 2013. Responses for Economic Analysis of Proposed Rule to List the New Mexico Meadow Jumping Mouse.

EXHIBIT 4. AVERAGE ADMINISTRATIVE CONSULTATION COSTS (2013$)

INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Informal	$1,900	$2,300	$1,500	$1,500	$7,200
Formal	$4,100	$4,700	$2,600	$3,600	$15,000
Programmatic	$12,000	$10,000	n/a	$4,200	$27,000
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (OCCUPIED HABITAT)					
Informal	$620	$780	$510	$500	$2,400
Formal	$1,400	$1,600	$880	$1,200	$5,000
Programmatic	$4,200	$3,500	n/a	$1,400	$9,000

Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2013, and a review of consultation records from several Service field offices across the country conducted in 2002.

Notes:

1. The levels of effort per consultation represent approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The cost estimates presented in this table may therefore not sum to the total costs reported due to rounding.
2. Estimates reflect average hourly time required by staff.

Exhibit 5 presents the total incremental costs associated with grazing activities on USFS land within the proposed critical habitat designation. We conservatively estimate that all costs will occur in 2014, following designation of critical habitat. Total costs associated with grazing activities are estimated to be $15 million.

EXHIBIT 5. INCREMENTAL COSTS ASSOCIATED WITH GRAZING ACTIVITIES ($2013)

UNIT	NAME	ESTIMATED COSTS IN 2014
1	Sugarite Canyon	$0
2	Coyote Creek	$0
3A	San Antonio Creek	$1,400,000
3B	Rio Cebolla	$1,900,000
3C	Rio de las Vacas	$3,400,000
4A	Silver Springs	$0
4B	Upper Rio Penasco	$670,000
4C	Middle Rio Penasco	$420,000
4D	Wills Canyon	$530,000
4E	Agua Chiquita Canyon	$730,000

UNIT	NAME	ESTIMATED COSTS IN 2014
5A	Little Colorado River	$1,300,000
5B	Nutrioso River	$2,000,000
5C	San Francisco River	$120,000
5D	East Fork Black River	$840,000
5E	West Fork Black River	$820,000
5F	Boggy and Centerfire Creeks	$850,000
5G	Corduroy Creek	$300,000
5H	Campbell Blue Creek	$230,000
6A	Isleta Marsh	$0
6B	Ohkay Owingeh	$0
6C	Bosque del Apache NWR	$0
7	Florida River	$0
8	Sambrito Creek	$0
TOTAL		**$15,000,000**

Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding

SECTION 7 COSTS OF OTHER ACTIVITIES

This section presents the analysis of likely impacts of the proposed critical habitat designation on activities other than grazing. Our analysis is based on information provided to the Service by Federal agencies regarding specific projects that may require future consultation, as well as information contained in public comments on the Proposed Rule.

U.S. Forest Service

USFS provided information on ongoing and planned activities occurring within the proposed critical habitat units, which include transportation projects and recreation.[24] Not all of these activities are considered threats to the mouse and its habitat, particularly in cases where they are occurring in areas that are already developed. For example, recreation occurring on developed recreation sites in the National Forests is not considered a threat to the mouse or its habitat because those sites do not contain habitat for the mouse.[25] This section identifies those specific projects that are likely to be subject to section 7 consultation based on information provided by USFS and the Service.

[24] U.S. Forest Service, Southwestern Region. November 7, 2013. Responses for Economic Analysis of Proposed Rule to List the New Mexico Meadow Jumping Mouse.

[25] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.

Transportation

USFS anticipates that a paving project will occur in 2014 on FR 249, which is located partially within Unit 5D (East Fork Black River). This unit is considered partially occupied by the mouse.[26] The Service expects that this project will require informal consultation, but it does not expect to recommend any conservation measures for the mouse or its critical habitat as long as the project does not go beyond the current footprint of a road, as this area is unlikely to contain suitable habitat.[27] In addition, as this unit is partially occupied by the mouse, it is unlikely that critical habitat would generate additional requests for conservation efforts beyond what would be requested due to the listing of the species.[28] Accordingly, incremental costs of critical habitat for this project are likely limited to the additional administrative costs of considering critical habitat as part of the informal consultation.

Recreation

Three programmatic consultations are expected to be re-initiated for the Land and Resource Management Plans (LRMPs) for the three National Forests containing proposed critical habitat (Santa Fe, Lincoln, and Apache-Sitgreaves).[29] These consultations would include proposed critical habitat Units 3, 4, and 5 and all of their subunits. As these re-initiations would be occurring regardless of critical habitat (due to the presence of the species in the forests), the incremental administrative costs of the consultations are limited to the additional effort to address adverse modification. In addition, for occupied areas, it is unlikely that critical habitat would generate additional requests for conservation efforts beyond what would be required due to the listing of the species.[30]

However, for areas within the forests that are unoccupied by the species, incremental impacts would include costs associated with conservation measures recommended in section 7 consultations, as they would not be recommended for these areas but for the presence of critical habitat.

According to the Service, it is likely that these consultations will focus on how to address the threat of dispersed recreation (i.e., recreation outside of developed recreation sites) in the National Forests.[31] While it is uncertain at this time what conservation measures the Service will recommend, they may include avoiding critical habitat or fencing areas identified as critical habitat.[32] The locations, type, and extent of fencing are uncertain. For purposes of this analysis, however, we make the conservative assumption that pipe fencing will be constructed along the entire length of

[26] U.S. Forest Service, Southwestern Region. November 7, 2013. Responses for Economic Analysis of Proposed Rule to List the New Mexico Meadow Jumping Mouse.
[27] Personal communication with U.S. Fish and Wildlife Service on December 5, 2013.
[28] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.
[29] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.
[30] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.
[31] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.
[32] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.

each proposed critical habitat unit overlapping the forests, except within grazing allotments where fencing is already occurring as described in the grazing section of this memorandum. For areas where the species is present, the costs of fencing would be baseline costs and are therefore not included in our estimate. For areas considered to be unoccupied, the costs of fencing are considered incremental costs of critical habitat designation. Note that a portion of this area may already be fenced and therefore this estimate may overstate actual costs.[33]

In order to estimate these costs, we conducted a GIS analysis to calculate the total length of unoccupied critical habitat within the National Forests but outside of the grazing allotments. This analysis indicates that approximately 40 miles of fencing will be necessary. We then assumed a high-end fencing cost of $20 per foot, which is the estimated cost of pipe fencing provided by USFS.[34] The total costs are therefore estimated to be approximately $4.2 million.

U.S. Army Corps of Engineers

The Corps' Albuquerque District provided the Service with feedback on ongoing and planned activities within the proposed critical habitat units, which include species and habitat management activities and water management projects.[35] In addition, the Service provided information on future consultations that it believes will likely include the Corps.[36]

Species and Habitat Management

According to the Corps' Albuquerque District, there is a proposed habitat restoration project ("Espanola Valley General Investigations") that includes the historic site at Ohkay Owingeh Pueblo (Subunit 6B). Because this subunit is considered completely unoccupied, the consultation would not occur absent critical habitat designation and therefore the costs of the consultation and any conservation measures recommended as part of the consultation would be considered incremental impacts. However, because the goal of the project is to benefit the habitat, the Service does not expect to recommend conservation measures above and beyond what those already required by the Corps as part of the project.[37] Therefore, we expect the incremental costs associated with this project will be limited to the costs of the consultation.

Water Management

The Corps conducts a variety of water-related activities in the areas proposed for critical habitat designation. In particular, the Civil Works program of the Corps' Albuquerque District is responsible for projects such as construction and maintenance of levees and catchments. The Service anticipates that the following two projects will

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[33] Personal communication with U.S. Fish and Wildlife Service on December 16, 2013.

[34] U.S. Forest Service, Southwestern Region. November 7, 2013. Responses for Economic Analysis of Proposed Rule to List the New Mexico Meadow Jumping Mouse.

[35] U.S. Army Corps of Engineers, Albuquerque District. November 21, 2013. New Mexico Meadow Jumping Mouse (NMMJM) request for information.

[36] Personal communication with U.S. Fish and Wildlife Service on December 16, 2013.

[37] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.

require section 7 consultation: (1) the Bernalillo to Belen Levees; and (2) the rehabilitation of Lake Dorothy and Lake Alice.

The Bernalillo to Belen Levees project will occur in Subunit 6A, which is unoccupied by the species. Therefore, incremental costs of critical habitat designation for this project include both the costs of consultation and the costs of any conservation measures recommended by the Service. According to the Service, it is unlikely to recommend additional conservation measures beyond what the Corps would require as part of their standard procedures except for possibly requesting that surveys be conducted in the area to determine whether the species is present.[38] According to the Corps, survey costs may range from $4,500 to $9,000 depending on the specific survey requirements (e.g., area to be surveyed and length of survey period).[39] For purposes of this analysis, we conservatively assume that the survey costs will be $9,000.

The Lake Dorothy and Lake Alice projects will occur in Unit 1 (considered partially occupied). The rehabilitation of Lake Dorothy and Lake Alice is associated with a wildfire that occurred in 2011 that resulted in devastation to the Sugarite Canyon area, which contains the nearby City of Raton's primary source of drinking water.[40] There is ongoing work to rehabilitate Lake Dorothy and Lake Alice and restore the general area (including stream and habitat restoration in areas within Unit 1). According to the Corps, three informal consultations are expected over the next five years on this follow-up work; for purposes of this analysis, we conservatively assume they will occur in the same year (2014).[41] Both the Service and the Corps agree that costs will likely be limited to the costs of consultation and that no additional costs related to conservation measures are likely, as the work is intended to benefit the species.[42,43] As Unit 1 is partially occupied by the species, incremental costs are likely limited to the additional administrative costs of considering critical habitat as part of the informal consultations.

In addition to the above projects that were identified by the Corps, the Service anticipates consulting on the operations of the Lemon Dam in Unit 7, which is owned by the Bureau of Reclamation. The Service anticipates that this consultation would be formal, and we assume for purposes of this analysis that the consultation will occur in 2014, following designation of critical habitat. As Unit 7 is partially occupied by the species, it is unlikely that critical habitat would generate additional requests for conservation efforts beyond what would be required due to the listing of the species.[44] Therefore, incremental costs to this project are likely limited to the additional administrative costs associated with addressing adverse modification in the consultation.

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[38] Personal communication with U.S. Fish and Wildlife Service on December 4, 2013.

[39] Personal communication with the U.S. Army Corps of Engineers on December 13, 2013.

[40] Public comment submitted by City of Raton on August 21, 2013, Docket Document No. FWS-R2-ES-2013-0014-0027.

[41] Personal communication with the U.S. Army Corps of Engineers, Albuquerque District, on December 17, 2013.

[42] Personal communication with U.S. Fish and Wildlife Service on December 12, 2013.

[43] Personal communication with the U.S. Army Corps of Engineers, Albuquerque District, on December 17, 2013.

[44] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

Lastly, the Service anticipates the re-initiation of a programmatic consultation for water use and management activities on the Middle Rio Grande, which would include Subunits 6A (unoccupied by the species) and 6C (partially occupied by the species). This re-initiation is expected to occur regardless of critical habitat designation due to the presence of the mouse in Subunit 6C. In addition, although the species is not present in Subunit 6A, its presence in Subunit 6C imparts substantial baseline protection. Specifically, project modifications recommended by the Service during section 7 consultation on water use and management activities in the Middle Rio Grande would be recommended due to the presence of the species in Subunit 6C regardless of critical habitat designation. It is unlikely that critical habitat would generate additional requests for conservation efforts beyond what would be required due to the presence of the species.[45] We therefore expect that incremental costs in Subunits 6A and 6C will be limited to the administrative costs of consultation.

Exhibit 6 presents the total incremental costs by subunit associated with the forecast consultations with the Forest Service and the Corps. These costs include the administrative costs associated with the consultations, as well as the costs of potential conservation measures, where applicable. Total costs are estimated to be $4.1 million over the next 20 years, or $360,000 on an annualized basis (seven percent discount rate).

EXHIBIT 6. INCREMENTAL COSTS ASSOCIATED WITH FORECAST CONSULTATIONS ON ACTIVITIES OTHER THAN GRAZING (2013$)

UNIT	NAME	ESTIMATED COSTS IN 2014
1	Sugarite Canyon	$7,200
2	Coyote Creek	$0
3A	San Antonio Creek	$6,000
3B	Rio Cebolla	$6,000
3C	Rio de las Vacas	$6,000
4A	Silver Springs	$3,600
4B	Upper Rio Penasco	$830,000
4C	Middle Rio Penasco	$3,600
4D	Wills Canyon	$3,600
4E	Agua Chiquita Canyon	$3,600
5A	Little Colorado River	$1,600,000
5B	Nutrioso River	$2,300
5C	San Francisco River	$2,300
5D	East Fork Black River	$4,700
5E	West Fork Black River	$1,800,000
5F	Boggy and Centerfire Creeks	$2,300

[45] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

UNIT	NAME	ESTIMATED COSTS IN 2014
5G	Corduroy Creek	$2,300
5H	Campbell Blue Creek	$2,300
6A	Isleta Marsh	$33,000
6B	Ohkay Owingeh	$7,200
6C	Bosque del Apache NWR	$9,000
7	Florida River	$5,000
8	Sambrito Creek	$0
TOTAL		**$4,400,000**

Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.

GEOGRAPHIC DISTRIBUTION OF ADMINISTRATIVE COSTS

Exhibit 7, below, presents the total quantified impacts for all activities (grazing and other) by Subunit. All costs are forecast to occur in 2014, and the total costs are estimated to be $20,000,000; therefore, costs of the proposed critical habitat designation are unlikely to exceed $100 million in a given year. As shown in the table, proposed critical habitat Subunit 3C is expected to generate the greatest incremental costs. This is due to particularly high costs associated with fencing costs related to grazing. Subunits 5A and 5E also have relatively high costs compared to other units; the high costs in these units are associated with the non-grazing fencing costs described in the above section on Recreation.

EXHIBIT 7. INCREMENTAL COSTS ASSOCIATED WITH FORECAST CONSULTATIONS ON ALL ACTIVITIES ($2013)

UNIT	NAME	TOTAL ESTIMATED COSTS IN 2014
1	Sugarite Canyon	$7,200
2	Coyote Creek	$0
3A	San Antonio Creek	$1,400,000
3B	Rio Cebolla	$1,900,000
3C	Rio de las Vacas	$3,400,000
4A	Silver Springs	$3,600
4B	Upper Rio Penasco	$1,500,000
4C	Middle Rio Penasco	$420,000
4D	Wills Canyon	$540,000

UNIT	NAME	TOTAL ESTIMATED COSTS IN 2014
4E	Agua Chiquita Canyon	$740,000
5A	Little Colorado River	$2,900,000
5B	Nutrioso River	$2,000,000
5C	San Francisco River	$120,000
5D	East Fork Black River	$840,000
5E	West Fork Black River	$2,700,000
5F	Boggy and Centerfire Creeks	$850,000
5G	Corduroy Creek	$300,000
5H	Campbell Blue Creek	$230,000
6A	Isleta Marsh	$33,000
6B	Ohkay Owingeh	$7,200
6C	Bosque del Apache NWR	$9,000
7	Florida River	$5,000
8	Sambrito Creek	$0
TOTAL		**$20,000,000**

Notes: The level of effort per consultation represents approximate averages based on the best available cost information. The cost estimates in this report are accordingly rounded to two significant digits to reflect this imprecision. The unit cost estimates therefore may not sum to the total costs reported due to rounding.

SECTION 4. OTHER COSTS OF THE CRITICAL HABITAT RULE

This section discusses the potential for incremental costs to occur outside of the section 7 consultation process. These types of costs include triggering additional requirements or project modifications under state laws or regulations, and perceptional effects on markets. These types of impacts may occur even when activities do not have a Federal nexus for consultation.

ADDITIONAL STATE REGULATION

Indirect incremental impacts may occur if the designation of critical habitat increases awareness of the presence of the species or the need for protection of its habitat. As shown in Exhibit 8, below, the mouse is provided some level of protection in the each of the states containing proposed critical habitat designation.[46] Although protective status for the species may not require implementation of conservation efforts sufficient to protect the species' habitat, these designations suggest that state agencies are likely to be aware of the presence of the species. We therefore assume that the designation of critical habitat is unlikely to trigger state-level impacts as a result of increased awareness of the species and its habitat in states where the mouse is afforded some

[46] U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.

protective status. The Service did not receive any public comments on the proposed rule suggesting this conclusion was incorrect.

EXHIBIT 8. STATE PROTECTIVE STATUS FOR NEW MEXICO MEADOW JUMPING MOUSE

STATE	PROTECTIVE STATUS
Arizona	Threatened species on the Arizona Game and Fish Department's list of Wildlife of Special Concern
Colorado	Species of greatest conservation need, Tier 1, on the Colorado Division of Wildlife's Comprehensive Wildlife Conservation Strategy
New Mexico	Endangered under New Mexico Wildlife Conservation Act of 1974
Source: U.S. Fish and Wildlife Service. July 8, 2013. Incremental Effects Memorandum for the Economic Analysis for the Proposed Rule to Designate Critical Habitat for the New Mexico meadow jumping mouse.	

POSSIBLE IMPACTS OF PUBLIC PERCEPTION

Comments received regarding proposed designations of critical habitat in various locations throughout the United States indicate that the public perceives critical habitat designation as possibly resulting in incremental changes to private property values, above and beyond those associated with specific forecast project modifications under section 7 of the Act.[47] These commenters believe that, all else being equal, a property that is inhabited by a threatened or endangered species, or that lies within a critical habitat designation, will have a lower market value than an identical property that is not inhabited by the species or that lies outside of critical habitat. This lower value results from the perception that critical habitat will preclude, limit, or slow development, or somehow alter the highest and best use of the property. Public attitudes about the limits and costs that the Act may impose can cause real economic effects to the owners of property, regardless of whether such limits are actually imposed. Over time, as public awareness grows of the regulatory burden placed on designated lands, particularly where no Federal nexus compelling section 7 consultation exists, the effect of critical habitat designation on properties may subside.

In the case of proposed critical habitat for the mouse, the habitat is located in areas where development pressure is low. Thus, the value of these lands is driven by their next best use, in this case, grazing. Despite the fact that a section 7 nexus is unlikely for grazing activities conducted on private acres, the ranching community may perceive that the designation of certain parcels as critical habitat will limit future grazing activities in those areas. In addition, private landowners hold renewable leases that are both inheritable and transferrable with the sale of the land, or in the case of USFS

[47] See, for example, public comments on the possible impact of designating private lands as critical habitat for the Northern spotted owl (as summarized in Industrial Economics, Incorporated. *Economic Analysis of Critical Habitat Designation for the Northern Spotted Owl: Final Report*. Prepared for the U.S. Fish and Wildlife Service. November 20, 2012. (p. 5-21) and the cactus ferruginous pygmy owl (as summarized in Industrial Economics, Incorporated. *Economic Analysis of Critical Habitat Designation for the Cactus Ferruginous Pygmy-Owl*. Prepared for the U.S. Fish and Wildlife Service. June 1999. p. 44)).

permits, the transfer of livestock (pending the approval of the USFS). Thus, impacts to grazing on Federal acres may affect the value of connected private holdings.

To evaluate the possible magnitude of such costs, we conduct an analysis to determine the total perpetuity value of the cattle that could be supported by all privately-owned land and associated Federal leases in the proposed critical habitat designation (i.e., AUMs). Public perception may diminish land values by some percent of these total values. Data limitations prevent us from estimating the size of this percent reduction or its attenuation rate due to public perception.

The total perpetuity value of current grazing activity represents the upper bound on possible costs rather than a best estimate of likely costs. Assuming the entire value of these AUMs (i.e., all economic activity associated with the parcel) is lost would likely overstate impacts and is not supported by the limited, existing academic literature investigating endangered species-related public perception effects.[48] In addition, these properties may experience similar perception-related effects for other reasons, including the presence of the listed mouse in the occupied areas, reducing the incremental portion of the impact attributable to mouse critical habitat.

To estimate the grazing activity supported by privately-owned land within the designation, this analysis relies on a 1989 study prepared for the California Department of Forestry and Fire Protection profiling the California Livestock Industry. As part of the study, the productivity of grazing lands for privately owned or leased land was compared to the productivity of land leased from USFS and the Bureau of Land Management (BLM). On average, depending on vegetation type, this study found that private lands range from being as productive to up to 17 times as productive as USFS and BLM grazing lands. To establish an upper bound of total AUMs supported by privately-owned land within the proposed critical habitat designation, our analysis applies a multiplier of 17 to the average number of AUMs per acre for the 24 active grazing allotments that overlap critical habitat in Apache-Sitgreaves, Lincoln, and Santa Fe National Forests. In addition we estimate the value of Federal allotments that could be associated with privately-owned properties due to their geographic proximity. Using private non-irrigated grazing fee rates for cattle specific to each state affected by the designation, we conclude that the total value of grazing that could be supported by the 4,140 acres of privately-owned land and Federal leases within the proposed designation is unlikely to exceed $100 million.[49]

SECTION 5. SECTION 7 AND OTHER ECONOMIC BENEFITS

The primary intended benefit of critical habitat is to support the conservation of threatened and endangered species, such as the mouse. As described in the previous sections of this memorandum, the designation may result in incremental conservation

[48] For a discussion of the available literature describing potential perceptional effects resulting from the Act, see Industrial Economics, Incorporated. Memorandum to the U.S. Fish and Wildlife Service, Supplemental Information on Perceptional Effects on Grazing – Critical Habitat Designation for the New Mexico Meadow Jumping Mouse. January 15, 2014.

[49] For additional detail describing our analysis of perceptional effects, see Industrial Economics, Incorporated. Memorandum to the U.S. Fish and Wildlife Service, Supplemental Information on Perceptional Effects on Grazing – Critical Habitat Designation for the New Mexico Meadow Jumping Mouse. January 15, 2014.

efforts for the mouse, including reduced grazing, fencing, and surveys for areas currently not occupied by the species. Various economic benefits may result from these incremental conservation efforts, including: (1) those associated with the primary goal of species conservation (i.e. direct benefits), and (2) those additional beneficial services that derive from conservation efforts but are not the purpose of the Act (i.e. ancillary benefits).

In order to quantify and monetize these benefits, information would be needed to determine (1) the incremental change in the probability of mouse conservation expected to result from the designation, and (2) the public's willingness to pay for such beneficial changes.[50] Although numerous published studies estimate individuals' willingness to pay to protect endangered species, we are not aware of any published studies that estimate the value the public places on preserving the mouse.[51] In addition, we do not have information on the expected change in species population levels that may result from critical habitat designation for the mouse. Lacking these data, we are not able to quantify the primary species conservation benefit of the critical habitat designation.

We therefore provide a qualitative summary of the categories of benefits that may result from implementation of the incremental conservation efforts described in this memorandum. Exhibit 9 provides information on these ancillary benefits and where they are expected to occur. In addition to the benefits listed in Exhibit 9, the maintenance or enhancement of use and non-use values for coexisting species, or for biodiversity in general, may also result from the incremental conservation efforts for the mouse.

EXHIBIT 9. POSSIBLE INCREMENTAL CONSERVATION EFFORTS FOR THE MOUSE AND ASSOCIATED BENEFITS

POSSIBLE INCREMENTAL CONSERVATION EFFORT	ASSOCIATED BENEFITS	RELEVANT UNITS
Fencing	• Improved water and soil quality • Ecosystem health for coexisting species	Units 3, 4, and 5
Reduction of AUMs	• Improved water and soil quality • Ecosystem health for coexisting species	Units 3, 4, and 5
Surveys	• Educational benefits	Subunit 6A
Note: All conservation efforts are intended to support the survival and/or recovery of the species.		

SECTION 6. SUMMARY

This analyses estimates direct (section 7) and indirect costs likely to result from the proposed critical habitat designation for the mouse. To determine direct costs, the

[50] For a detailed discussion of these data limitations, see Flight, M. and R. Unsworth, Industrial Economics, Incorporated. 2011. *Quantifying Benefits of Critical Habitat Designation for Listed Species*. Memorandum to Douglas Krofta, U.S. Fish and Wildlife Service.

[51] See, for example, Loomis, J.B. and Douglas S. White. 1996. *Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis*. Ecological Economics, 18(3): 197-206.

analysis forecasts the total number of future consultations likely to occur for grazing, transportation, recreation, water management, and species and habitat management undertaken by or permitted by Federal agencies within proposed critical habitat. In addition, the analysis forecasts costs associated with conservation efforts that may be recommended in consultation for those activities occurring in unoccupied areas. The total quantifiable incremental section 7 costs associated with the proposed designation are estimated to be $20,000,000 in 2014.

In terms of indirect costs, this analysis concludes that the designation of critical habitat is unlikely to trigger additional requirements under state or local regulations. In addition, this analysis is supplemented by a separate memorandum assessing the potential perceptional effects on grazing. This analysis concludes that the aggregate value of grazing activities on these lands is less than $100 million.

Therefore, we conclude that critical habitat designation for the mouse is unlikely to generate costs exceeding $100 million in a single year. The magnitude of benefits is highly uncertain, and quantification would require primary research and the generation of substantial amounts of new data, which is beyond the scope of this memorandum and Executive Order 12866.[52]

[52] Executive Order 12866 directs agencies to base regulatory decisions on "the best reasonably obtainable scientific, technical, economic, and other information concerning the need for, and consequences of, the intended regulation" (58 FR 51736). For a detailed discussion of data limitations associated with the estimation of critical habitat benefits, see Flight, M. and R. Unsworth, Industrial Economics, Incorporated. 2011. *Quantifying Benefits of Critical Habitat Designation for Listed Species*. Memorandum to Douglas Krofta, U.S. Fish and Wildlife Service.